

Claims:

1. An ossicle prosthesis (10; 20), which replaces or spans at least one member  
5 of the human ossicle chain, in which the ossicle prosthesis (10; 20), on both of its  
ends, has a first securing element (11) and a second securing element (12; 22) for  
mechanical connection to a member of the ossicle chain, to the eardrum or to the  
inner ear, and between the two securing elements (11, 12; 22) has a ball joint,  
which includes two struts (13, 13'), which are solidly joined to the first securing  
10 element (11), extend parallel or at an angle to one another, and between them  
enclose a gaplike space, in which a ball (14) is pivotably supported in two  
recesses (15) in the struts (13, 13'), and the ball (14) is part of an elongated shaft  
(16) which connects the two securing elements (11, 12; 22) to one another,  
characterized in that  
15 the elongated shaft (16) includes many balls (14, 14', 14'') adjoining one  
another, of which one is the ball (14) in the ball joint;  
the elongated shaft (16) is displaceable through the gaplike space between the  
two struts (13, 13') of the ball joint, in a direction perpendicular to the struts (13,  
13') and toward or away from the first securing element (11) and through a  
20 perforation (17) in the first securing element (11), and one each of the balls (14,  
14', 14'') snaps in a snapped-in position between the recesses (15) of the struts  
(13, 13'), so that a desired length of the shaft (16) modulo adjusts the spacing of  
the balls (14, 14', 14'') from one another, and the part of the shaft (16) protruding  
through and past the first securing element (11) can be cut to  
25 length;  
and the gaplike space between the two struts (13, 13') of the ball joint can be  
made narrower for fixation of the shaft (16) after the desired length has been  
adjusted.

2. The ossicle prosthesis as defined by claim 1, characterized in that the two struts (13, 13') of the ball joint are embodied integrally with the first securing element (11).

5        3. The ossicle prosthesis as defined by claim 1, characterized in that each of the two struts (13, 13') of the ball joint has at least one and preferably plurality of recesses (15, 15'), located side by side, for receiving a ball (14) of the elongated shaft (16), and two recesses (15 and 15', respectively) of the two struts (13, 13') are always diametrically opposite one another.

10        4. The ossicle prosthesis as defined by claim 3, characterized in that the recesses (15, 15') have the shape of round holes.

15        5. The ossicle prosthesis as defined by claim 1, characterized in that each of the two struts of the ball joint has at least one oblong-slot-shaped recess for receiving a ball (14) of the elongated shaft (16) displaceably in the longitudinal direction of the oblong hole, and two recesses of the two struts are always diametrically opposite one another.

20        6. The ossicle prosthesis as defined by claim 1, characterized in that the balls (14, 14', 14'') of the elongated shaft (16) each have the same outer diameter and are located equidistantly along the axis of the shaft (16).

25        7. The ossicle prosthesis as defined by claim 1, characterized in that the elongated shaft (16) includes a rod element, onto which balls (14, 14', 14'') provided with through bores and then fixed on the rod element are slipped.

8. The ossicle prosthesis as defined by claim 6, characterized in that the

elongated shaft (16) includes a rod element, onto which balls (14, 14', 14") provided with through bores and then fixed on the rod element are slipped.

5        9. The ossicle prosthesis as defined by claim 7, characterized in that the balls (14, 14', 14") are welded to the rod element, preferably by means of laser welding.

10. The ossicle prosthesis as defined by claim 7, characterized in that the through bores of the balls (14, 14', 14") are produced by means of lasers.

10        11. The ossicle prosthesis as defined by claim 7, characterized in that the rod element is made from a flexible material.

15        12. The ossicle prosthesis as defined by claim 1, characterized in that the securing elements (11, 12; 22) are embodied in plate-, bell-, or ram-shaped form or as a clip.

13. The ossicle prosthesis as defined by claim 1, characterized in that the first securing element (11) includes a head plate embodied for contact with the eardrum.

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14. The ossicle prosthesis as defined by claim 1, characterized in that the prosthesis or parts thereof are made from biocompatible plastics, in particular silicone, or fiber-reinforced materials.

25        15. The ossicle prosthesis as defined by claim 1, characterized in that the prosthesis or parts thereof are made from titanium and/or gold and/or tantalum and/or an alloy of these metals.

16. The ossicle prosthesis as defined by claim 1, characterized in that the

prosthesis or parts thereof are made from a material with shape memory (memory effect), in particular Nitinol.

17. The ossicle prosthesis as defined by claim 1, characterized in that the  
5 distribution in terms of mass of the individual parts of the prosthesis is calculated as a frequency of a desired, predeterminable frequency response of the conduction of sound in the middle ear.

18. The ossicle prosthesis as defined by claim 1, characterized in that at least  
10 one additional mass is secured to a part of the ossicle chain or the prosthesis as a function of a desired, predeterminable frequency response of the conduction of sound in the middle ear.

19. The ossicle prosthesis as defined by claim 18, characterized in that the  
15 additional mass is secured by means of a clip to a part of the ossicle chain or of the prosthesis.

20. The ossicle prosthesis as defined by claim 1,  
characterized in that the prosthesis is connected to an active vibrating part of an  
20 active, in particular implantable, hearing aid.